

# **Local Socioeconomic Character**

## **Specialist Report**

### **East Fork Boulder Creek Native Trout Restoration Project USDA-Forest Service-Dixie National Forest**

Submitted by: /s/ Georgina Lampman

Georgina Lampman, Regional Planner  
Intermountain Region

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## Introduction

During the scoping and comment period, concerns were raised about the potential effect of the proposed project on three aspects of local economy of Boulder, Utah. These three aspects were: 1) businesses that depend on tourists who visit for the perceived “pristine” or “primitive” characteristics of the area, 2) “organic” food grown locally and irrigated with water from Boulder Creek, and 3) local beekeeping. Additionally, comments reflected that several residents moved to the area because of the “pristine” characteristics of the area.

This analysis will address potential effects of the proposed project on the pristine characteristics of the area, tourist-based businesses, the vision and goals of Boulder, organic certification, and beekeeping. Effects are based on the No Action, Proposed Action, and Non-Chemical Treatment alternative, including actions that are not part of the Forest Service decision but connected to the project, as described in Appendix 1. The proximity of the project relative to Boulder is displayed in Figure A.

## ***Description of Affected Environment and Analysis Method***

### **DIRECT EFFECTS:**

***Pristine environment.*** One topic of concern raised during the scoping and comment period was about effects to the businesses that provide goods and services to tourists who may not visit the area if they believe the application of chemicals to the water alters the pristine or primitive environment. *Pristine*, as defined by Webster’s Online Dictionary, is

1. Completely free from dirt or contamination;
2. Immaculately clean and unused;
3. Belonging to the earliest period or state; original; primitive; primeval;
4. Being original, primitive, primordial, authentic or initial;
5. Being primeval or primaeval;
6. Being primary, primal, prime or foremost;
7. Being ancient or old;
8. Being fresh, new or unused;
9. Being antique, antiquated or obsolete.

(<http://www.websters-online-dictionary.org>)

The direct effect will be analyzed by a qualitative comparison of changes due to actions of the alternatives relative to area characteristics per the definition of *pristine*. The potential direct effect of the proposed treatment would be changes in the pristine

characteristics of the project area and surrounding landscape on Forest Service lands above Boulder, Utah. The area of analysis will be the three (HUC 6) watersheds, Headwaters Boulder Creek, Bear Creek – Boulder Creek, and Deer Creek.

Although several comments received contained concern about effects to the “primitive” environment of the area, the term does not apply to the proposed project. *Primitive*, as defined by Webster’s Online Dictionary, is

1. Belonging to an early stage of technical development; characterized by simplicity and (often) crudeness;
2. Little evolved from or characteristic of an earlier ancestral type;
3. Used of preliterate or tribal or nonindustrial societies;
4. Of or created by one without formal training; simple or naive in style;
5. Of or pertaining to the beginning or origin, or to early times; original; primordial; primeval; first; as, primitive innocence;
6. Of or pertaining to a former time; old-fashioned; characterized by simplicity;
7. Original; primary; radical; not derived;
8. Being original or genuine;
9. Being elementary, rudimentary or elemental.

(<http://www.websters-online-dictionary.org>)

Definitions 3 and 4 for *primitive* are not applicable to use of the adjective relative to the environment and will not be discussed further. The other definitions relate to evolutionary stage, which the project does not affect; therefore, this analysis will not address the primitive characteristic of the project area. Effects to the primitive characteristic of the project area will not be discussed further.

## **INDIRECT EFFECTS:**

### ***Tourist-based businesses***

Potential changes to the perception of a pristine environment or access to the treatment area could potentially indirectly affect businesses that provide goods and services to tourists who may not visit the area if they believe the application of chemicals to the water alters the pristine environment or that the access restrictions would affect their experience. Analysis of the effects will be a qualitative comparison of numbers and types of businesses in Boulder, Utah, that may be affected. The affected environment used for this analysis is the group of businesses identified in the U.S. Census Bureau County Business Patterns database for the Boulder zip code, 84716 (<http://censtats.census.gov>).

### ***Boulder vision and goals***

Potential changes to the environment or perception of pristine environment could potentially indirectly affect the ability of Boulder to move towards its vision or goals as stated in the 2009 Boulder Town General Plan. Analysis of effects will be based on the potential effects to the goals and vision statements of the 2009 Boulder Town General Plan.

### ***Social value of pristine environment***

The Forest cannot determine how many people moved to Boulder because of the pristine characteristic of the area; therefore, the analysis assumes that all Boulder residents did. The most recent publicly available U.S. Census Bureau data indicate the community of Boulder had an estimated population of 180 in 2000 and 189 in 2009 ([www.factfinder.census.gov](http://www.factfinder.census.gov)). The Forest also cannot determine or analyze how each individual “values” the pristine characteristic of the area, including the spiritual, cultural, or psychological value of the area to an individual; therefore, the indirect effect will be analyzed by the qualitative comparison of changes due to the actions of the alternatives relative to area characteristics per the definition of *pristine*.

### ***Organic certification***

Comments indicated that there are organic growers or producers in the area. The Forest does not know how many there are, if they are certified organic operations, or if they operate under the Organic Crop Improvement Association, International (OCIA), US Department of Agriculture (USDA), or state of Utah organic standards; therefore, for the purpose of this analysis, the assumption is made that any of the growers may be or may seek to be certified under any or all three programs.

Downstream water users may be or may apply to be certified as organic growers or producers. The potentially affected would be the downstream irrigators. The potential effect on these users would be indirect relating to the proposed project’s effects on the water in the treatment area relative to the organic certification standards under the OCIA, USDA, and Utah organic certification programs and as they relate to rotenone, water quality and potassium permanganate.

### ***Beekeeping***

Because concern was raised about effects of the actions of the alternatives on beekeeping, the direct effect that will be analyzed is the effect of the actions on bees. The area of analysis will be the subwatersheds of the project area and estimated 0.25 to 0.50 mile downstream that could be affected by the activities of the Proposed Action.

## **CUMULATIVE EFFECTS:**

In addition to the U.S. Census Bureau information, the most recent Boulder Town General Plan (January 2009) was also reviewed to characterize the local economy. The Boulder Town General Plan describes the community as “experiencing an increased number of visitors” because of the “All American Road” designation of Utah Highway 12 and the “world-class scenery of the area.” It also states, “With the decrease in traditional uses such as logging and ranching, the increased tourism is expected to impact the local economy to a limited extent.” The Boulder Town General Plan also notes that Garfield County’s “mapping and promotion of OHV/ATV trails will further attract tourists to utilize designated motorized trails on [the Grand Staircase-Escalante National Monument] and Dixie National Forest lands around Boulder.” Because the potential changes are to specific types of local businesses, the cumulative effect will be on the potential change to the overall businesses in Boulder from past, present, and reasonably foreseeable actions. The measure will be a qualitative comparison of this effect. The cumulative effects area is the town of Boulder.

### ***Environmental Consequences - Direct and Indirect Effects***

#### ***Pristine environment***

##### **Direct Effects**

###### *No Action*

Under the No Action alternative, there would be no changes to the management that has been occurring on NFS lands. The existing management impacts the area’s character relative to Webster’s definition of *pristine*. The NFS portion of the treatment area itself is in Management Area 9A (Riparian Emphasis); however, adjacent management areas include 2A (Semi-Primitive Recreation), 6A (Livestock Grazing), and 7A (Wood Production and Utilization), as displayed in Figure B. Management activities that have occurred and will continue to occur within the area in the foreseeable future include the presence and operation of the Garkane Energy Boulder Creek Hydroelectric Plant, livestock grazing, timber harvest, timber stand management, and aspen stand management (see Appendix 2). The area has existing open, closed, and administrative roads and non-motorized trails and will continue to do so under the Dixie National Forest Motorized Travel Plan. Even the 9A acres include stream crossings. See Appendix 2 of this report for a list of the activities.

The 6A and 7A management areas that surround most of the treatment area would not meet the Webster’s definitions 1, 2, or 8. They are actively managed. Signs of human use are throughout, including roads, range structures, facilities at the Garkane Energy Boulder Creek Hydroelectric plant, the buildings and range structures on private lands, the dam that forms Kings Pasture Reservoir, and the penstock.

In that the treatment area has been planted with non-native trout, it would not meet the definitions 3 through 6.

Relative to definitions 7 and 9, the area is no older or antiquated than any other on the District.

Management Area 2A, Semiprimitive Recreation, is defined as a setting “dependent upon a perception of remoteness” (LRMP IV-63). There would be no changes to the existing activities to affect the perception under the No Action alternative.

### *Proposed Action*

The effects of the Proposed Action would be the same as for the No Action. There would be the temporary addition of the chemicals to the stream and presence of application personnel during treatment periods, affecting definitions 1, 2, and 8, but those effects would not be long-term, and they would not affect the existing state. Based on estimates in the specialist report on Effectiveness of Treatments, presence of personnel would be up to 62 people for 3 days per year for up to 3 consecutive years for the removal effort.

The temporary planting of hybrid sterile trout until the native CRCT can be re-established would not alter the existing state of having non-native trout. Even when the CRCT is re-established, only those that came from recolonization for the existing population would meet definitions 3 through 6, although the CRCT would be the species that would have been in the pristine state.

### *Non-chemical Treatment alternative*

The effects of the Non-chemical Treatment alternative would be the same as for the Proposed Action, except that there would be no temporary addition of chemicals to the treatment area and the duration of the temporary presence of personnel and equipment would be higher, although the number of personnel during any one treatment would be lower. As described in Appendix 1, disturbance from presence of personnel would be at least 20 people for 20 days for 4 times a year, for at least 4 and up to 10 consecutive years for the removal effort for the stream; 5 people for 30 days for spring inflows and tributaries for at least 4 and up to 10 consecutive years; 2 people, 18 days per year for at least 4 consecutive years for the netting effort of the private pond and reservoir; and additional personnel and equipment for the construction of the added barrier on private land.

## **Indirect Effects**

### ***Social value of pristine environment***

#### *No Action*

The No Action alternative would make no changes to the existing environment. None of the Boulder residents would be affected. The existing pristine character of the area would be as described above.

#### *Proposed Action*

Under the Proposed Action, changes to the pristine character would be as described above. This could potentially impact the population of Boulder, estimated at 189 in 2009, if all the residents perceive the area as currently pristine, hold pristine as a value, and believe any changes as described are an impact.

#### *Non-chemical Treatment alternative*

Under the Non-chemical Treatment alternative, the effects would be the same as for the Proposed Action except that the changes in the pristine characteristics would be as described above for the Non-chemical Treatment alternative.

### ***Tourist-based businesses***

#### *No Action*

The No Action alternative would have no effects on the pristine state of the treatment area or adjacent Forest Service managed areas; therefore, it would have no effect on tourist perceptions of pristine and tourist-based business reliant on tourists with such perception.

#### *Proposed Action*

Although information on individual businesses is not available from publicly available sources, Table 1 displays the U.S. Census Bureau County Business Patterns information for Boulder, Utah, considered for this analysis as the best publicly available data for Boulder.

The industries generally viewed as related to tourism-sensitive employment include retail trade; passenger transportation; arts, entertainment and recreation; and accommodation and food services (Marcouiller and Xia 2008). It is not known, without additional research, such as surveys, what exact proportion of the jobs in these sectors is attributable to expenditures by visitors, including business and pleasure travelers,

versus by local residents. Tourism probably has an effect mostly on the Accommodation and Food Service industry in Boulder. Tourists may also influence the Recreation industry, for example, local guide services, and the Retail industry, for example, small stores providing artwork, groceries, or souvenirs. Passenger transportation is not an identified industry for Boulder.

Table 1. Business pattern information for zip code 84716 (Boulder, UT) from 2008 ZIP Code Business Patterns (North American Industry Classification; U.S. Census Bureau, <http://censtats.census.gov/cbpnaic/cbpnaic.shtml>). Total number of employees on payroll on March 12 was 58.

Industry	Total Establishments	Number of Establishments by Employment size-class		
		1-4	5-9	10-19
Utilities	3	2	1	0
Construction	2	0	2	0
Manufacturing	1	1	0	0
Retail trade	3	3	0	0
Educational services	1	1	0	0
Arts, entertainment, and recreation	3	3	0	0
Accommodation and food service	4	2	0	2
TOTAL	17	12	3	2

The data indicate that the Accommodation and Food Service industry is only a small proportion of the total businesses (4 of 17). Assuming the minimum number of employees in other industries is 25 (10 with 1 employee, 3 with 5 employees), based on the ranges provided in Table 1, the employees in the Accommodation and Food Service industry could range from 22 to 33 (2 at 1 and 2 at 10 as minimum; 58 less 25 as maximum). Although the data are limited to 2008 information, and thus may not accurately reflect the current situation in Boulder, the data indicate that although low in proportion of businesses (24%), the Accommodation and Food Service industry provides employment for a disproportionately large number of employees (38 to 57%, see Table 2).

Businesses in the Retail Trade and Arts, Entertainment, and Recreation industries also have the potential of being affected. They account for 6 establishments. Assuming the minimum number of employees in other industries is 41 (6 with 1 employee, 3 with 5



employees, 2 with 10 employees), the employees in these two industries could range from 6 to 17 (6 at 1 and 58 less 41).

It is not known if the employees are local residents. This analysis assumes they are in order to provide the worst case scenario of effects to the Boulder population. The total number of employees in the three potentially affected industries would range from 28 to 39 (22 and 6 as minimum, 58 less 19 minimum [4 at 1, 3 at 5] in other industries). Based on the 2008 data, if all the employees are residents of Boulder, the employees of the three industries (Accommodation and Food Service and the combination of Retail Trade and Arts, Entertainment, and Recreation) could represent up to 21 percent of the Boulder population (38 of 184, 2008 population estimate ([www.factfinder.census.gov](http://www.factfinder.census.gov))). Because the US Census Bureau data are based on employees on payroll on March 12, it is unknown how well these employment figures reflect other times of the year.

Table 2. Proportions of businesses, workforce, and Boulder, Utah, population of potentially affected industries, based on business pattern information for zip code 84716 (Boulder, UT) from 2008 and 2008 census (ZIP Code Business Patterns (North American Industry Classification; U.S. Census Bureau, <http://censtats.census.gov/cbpnaic/cbpnaic.shtml> and [www.factfinder.census.gov](http://www.factfinder.census.gov)).

Industry	# of businesses	% of businesses	# of employees	% of workforce	% of Boulder population**
Accommodation and Food Service	4	24	22 to 33	38 to 57	12 to 18
Retail Trade and Arts, Entertainment, and Recreation	6	35	6 to 17	10 to 29	3 to 9
Combined	10	59	28 to 39*	48 to 67	15 to 21

\*Combined maximum is capped at 39 due to combined minimum of other industries.

\*\*It is unknown if employees are residents of Boulder. Percentages assume they are to provide worst case scenario of effect to Boulder population.

Specific changes in tourism and thus changes in businesses due to perceived changes in the pristine character of the area cannot be determined. Changes would depend on actual perception of the potential tourists, their reaction to the changes, and how the changes may be described by the businesses that solicit the tourists. Changes would also depend on the actual reaction of potential tourists to the prohibition of access to the treatment area during treatment and for 3 days after treatment and the potential for disturbance from the activities associated with the treatment (estimated 62 people for 3 days per year for up to 3 consecutive years for the removal effort). An extreme effect would be that all Accommodation and Food Service, Retail Trade, and Arts, Entertainment, and Recreation businesses would become non-viable, affecting 10 of 17 businesses and employment of up to 39 people.

### *Non-chemical Treatment Alternative*

The indirect effects to tourist-based businesses from the Non-chemical Treatment alternative would be the same as for the Proposed Action, except that there would be no prohibition of access and the potential disturbance from activities associated with the treatment would be of fewer people but of longer duration per year, multiple times per year, and for more years (up to 20 people (3 or 4 crews) for 16-21 days, 3-4 times in a single year, for up to 10 years of removal effort).

### ***Boulder vision and goals***

#### *No Action*

The No Action alternative would have no actions and thus no effects on Boulder's ability to move towards its Vision and Goals.

#### *Proposed Action*

The Boulder Town General Plan includes the following Vision Statement: The primary objectives of the community are (1) to preserve the ranching and agricultural lifestyle and heritage of the area and the rural spirit of Boulder; (2) to preserve the open space, clean air, dark skies, and quiet country-style atmosphere that our families have enjoyed for over 100 years and (3) to promote a balance of conserving resources and development/growth. In addition to these primary objectives, Boulder wants to remain economically sound by promoting appropriate commercial and cottage industry growth on a small scale.

The Proposed Action would have no actions that affect the Town's balance of conserving resources and development/growth; therefore, the third part of the Vision Statement will not be discussed further.

The only environmental factor that the Proposed Action would affect that relates to the first Vision statement, "1) to preserve the ranching and agricultural lifestyle and heritage of the area and the rural spirit of Boulder" would be the water quality that leaves the treatment area and is used for ranching and agriculture. Rotenone would leave the project area from three distinct places: Boulder Creek below the fish barriers, Garkane's penstock at the upper hydroplant, and the main Garkane Hydroplant facility. The Proposed Action would use potassium permanganate to neutralize rotenone at all three of these locations. As highlighted in the Aquatic Biota Specialist Report, this reaction can often take 30 minutes to complete, and the potentially affected area could be 0.25-0.5 miles (0.4-0.8 km) downstream from the neutralization stations. Except for one private landholding, no other private ranch or agricultural business would be affected.

The private property potentially affected is used as a pasture and is fed by the Upper Garkane Hydroplant outflow and is approximately 0.3 miles (0.5 km) downstream from the neutralization site. As described in the Water Quality, Floodplains, and Wetlands specialist report, the persistence of the chemicals in this reach could possibly occur for less than a day, once a year, for up to three consecutive years. According to the water right data, the water is used for livestock. Also as discussed in the Water Quality, Floodplains, and Wetlands specialist report, there would be no direct effects to water quality relating to the designation of irrigation water and stock water (Utah State Use Designation Class 4) beneficial uses as a result of the chemical treatment with rotenone. The Proposed Action would not affect the environment in such a way that it would negatively affect the current “ranching and agricultural lifestyle” of the downstream irrigators.

The Boulder Town General Plan vision statement also includes the following:

- (2) to preserve the open space, clean air, dark skies, and quiet country-style atmosphere that our families have enjoyed for over 100 years

The Proposed Action would not change how Boulder manages its open space. It would have no effects on air quality or dark skies. The Proposed Action would affect the quiet atmosphere of the area due to disturbance caused by the presence of an estimated 62 people for 3 days per year for up to 3 consecutive years for the removal effort.

The 2009 Boulder Town General Plan includes the following community goals:

1. To preserve Boulder’s rural agricultural atmosphere and cultural resources.
2. To promote farming, ranching and the conservation of open lands to support agricultural endeavors.
3. To preserve the natural beauty, open space, clean air and water and quiet atmosphere.
4. To keep agricultural fields open, watered, and productive
5. To encourage pride in the town’s appearance and maintenance of our community.
6. To promote strong community involvement in planning for the town’s orderly and controlled growth.
7. To provide facilities for education, recreation, and cultural activities.
8. To provide for improved traffic flow and maintenance of our town roads.

9. To foster economic viability of the community by promoting small community and cottage industry compatible with the above goals.
10. To maintain diverse community structure by creating housing opportunities for seasonal workers and low to moderate income individuals.
11. To control and limit noise.
12. To protect the dark skies and natural nighttime visual environment.

Goals 5-8 and 10 are not related to potential changes in the environment relating to the proposed project; therefore, they will not be discussed further.

Indirect effects to the character of Boulder, as defined by its community goals in the 2009 Boulder Town General Plan, as a result of changes in the environment from the Proposed Action are as follows:

1. To preserve Boulder's rural agricultural atmosphere and cultural resources.
  - As discussed above, the Proposed Action would not affect the ranching and agricultural uses of private property in Boulder. The Forest Archeologist has determined that the Proposed Action would have no effect to cultural resources.
2. To promote farming, ranching and the conservation of open lands to support agricultural endeavors.
  - As discussed above, the Proposed Action would not affect the ranching and agricultural uses of private property in Boulder. The Proposed Action would not affect Boulder's management of its open lands.
3. To preserve the natural beauty, open space, clean air and water and quiet atmosphere.
  - As discussed above, the Proposed Action would have no effects to air quality or dark skies. Except for the disturbance caused by the presence of an estimated 62 personnel, 1.5 to 3 days a year, for up to 3 consecutive years, the Proposed Action would not affect the quiet atmosphere of the area. Per the Water Quality, Floodplains, and Wetlands specialist report, the natural beauty and clean water in the treatment area could be affected for a up to 4 days per year, up to 3 consecutive years, due to dead but not yet removed fish and chemical presence during chemical treatment.
4. To keep agricultural fields open, watered, and productive
  - As discussed above, the Proposed Action would not affect the ranching and agricultural uses of private property in Boulder.
9. To foster economic viability of the community by promoting small community and cottage industry compatible with the above goals.
  - As discussed above, the Proposed Action would not affect the ranching and agricultural uses of private property in Boulder. As discussed

below, it would also not affect the beekeeping operation. The Proposed Action would not affect how Boulder manages businesses to maintain small community and cottage industry businesses in the community.

11. To control and limit noise.

- As discussed above, the Proposed Action would result in disturbance associated with the chemical application for 1.5 to 3 days a year, for up to 3 consecutive years.

12. To protect the dark skies and natural nighttime visual environment.

- The Proposed Action would have no effect on dark skies or the nighttime visual environment.

*Non-chemical Treatment alternative*

Under the Non-chemical Treatment alternative, there would be no changes to water quality that would affect the downstream water users; therefore, there would be no effect on the first vision statement of the 2009 Boulder Town General Plan.

Relating to the second vision statement, the effects of the Non-chemical Treatment alternative would be the same as for the Proposed Action except that the disturbance to the quiet atmosphere of the area would be by the presence of up to 20 people (3 or 4 crews) for 16-21 days, 3-4 times in a single year, for up to 10 years of removal effort.

Indirect effects to the character of Boulder, as defined by its community goals in the 2009 Boulder Town General Plan, as a result of changes in the environment from the Non-chemical Treatment alternative are as follows:

1. To preserve Boulder's rural agricultural atmosphere and cultural resources.
  - As discussed above, the Non-chemical Treatment alternative would not affect the ranching and agricultural uses of private property in Boulder. The Forest Archeologist has determined that the Non-chemical Treatment alternative would have no effect to cultural resources.
2. To promote farming, ranching and the conservation of open lands to support agricultural endeavors.
  - As discussed above, the Non-chemical Treatment alternative would not affect the ranching and agricultural uses of private property in Boulder. The Non-chemical Treatment alternative does not affect Boulder's management of its open lands.
3. To preserve the natural beauty, open space, clean air and water and quiet atmosphere.
  - As discussed above, the Non-chemical Treatment alternative would have no effects to air quality or dark skies. Disturbance to the quiet atmosphere of the area would result from the presence of up to 20 people (3 or 4 crews) for 16-21 days, 3-4 times in a single year, for up to 10 years of removal effort. The natural beauty in the treatment area could

be affected for several days per year, for up to 10 years, due to dead but not yet removed fish. There would be no effect to clean water.

4. To keep agricultural fields open, watered, and productive
  - As discussed above, the Non-chemical Treatment alternative would not affect the ranching and agricultural uses of private property in Boulder.
9. To foster economic viability of the community by promoting small community and cottage industry compatible with the above goals.
  - As discussed above, the Non-chemical Treatment alternative would not affect the ranching and agricultural uses of private property in Boulder. As discussed below, it would also not affect the beekeeping operation. The Non-chemical Treatment alternative would not affect how Boulder manages business to maintain small community and cottage industry businesses in the community.
11. To control and limit noise.
  - As discussed above, the Non-chemical Treatment alternative would result in disturbance to the quiet atmosphere of the area due to the presence of up to 20 people (3 or 4 crews) for 16-21 days, 3-4 times in a single year, for up to 10 years of removal effort.
12. To protect the dark skies and natural nighttime visual environment.
  - The Non-chemical Treatment alternative would have no effect on dark skies or the nighttime visual environment.

### ***Organic certification***

#### ***No Action***

Under the No Action alternative, there would be no treatments that would change conditions on downstream users who may have or may apply in the future for organic certification.

#### ***Proposed Action***

Under the Proposed Action, the applied chemicals would be neutralized, either chemically or naturally, approximately 30 minute travel time (0.25-0.5 miles) downstream of the fish barriers in Boulder Creek. Neutralization would also occur before the waters reach any irrigators, except for one private parcel, which holds a water right for irrigation for livestock watering. It is not known if this operation holds or seeks organic certification but for the purpose of this analysis is assumed to do so. Rotenone or potassium permanganate concentrations would not reach properties of other irrigators.

OCIA, USDA, and Utah standards were reviewed for those that are applicable to rotenone, water quality, and potassium permanganate. This review and relationship of the Proposed Action to the OCIA and USDA standards are in Appendices 3 and 4,

respectively, of this report. Most of the OCIA and USDA standards pertain to how operations are managed at the site requesting organic certification. The Proposed Action would not determine how operations are managed on other than Forest Service lands. Potential effects, therefore, are those that may relate to the water quality of waters flowing from the treatment area off Forest Service lands. Of the OCIA standards, six could potentially pertain to the Proposed Action. None would be affected by the Proposed Action, as described in Table 3.

**Table 3. OCIA standards that could potentially be affected by the Proposed Action.**

<b>Standards relating to rotenone</b>	<b>Potential effect</b>
3.5 Feed 3.5.10 Water for livestock must be free of contamination from hazardous substances.	Analysis indicates that under the Proposed Action it is possible that rotenone may reach one private landowner prior to it being neutralized. This would occur at most for 1 day a year for up to 3 consecutive years. Because neutralization would have been occurring, the concentration level would be lower than the application concentration, and it would continue to lower over time and distance through natural degradation. The application concentration is expected to be lower than the maximum allowed (200 ppb). Even at the maximum application concentration, with neutralization and natural degradation the risks to mammals are “far below the level of concern” and “there is no basis for asserting that adverse effects are plausible in large and small mammals when rotenone is applied at the highest application rate considered in the risk assessment (200 ppb)” (Forest Service 2008). The acute hazard quotient (i.e. for acute toxicity) for birds, based on the maximum application concentration, with neutralization and natural degradation, is also below the level of concern (Forest Service 2008). Chronic exposure is not expected because of the short duration of the application.
4.2 Honey 4.2.4 Foraging Areas b. Beekeeper must provide clean water (Authorized Methods and Materials: Dairy and Eggs, Section 10: Water Quality) and sufficient OCIA forage to feed the bees throughout the season.	Proposed Action would not affect water quantity. Proposed Action would not determine how private landowners provide water to animals. Rotenone, as would be applied, is considered “practically non-toxic” to honeybees (Forest Service 2008).
<b>Standards relating to water quality</b>	<b>Potential effect</b>
4.4 Shiitake and Oyster Mushrooms 4.4.5 Water Well, stream and pond water used for soaking logs and blocks must be tested to determine if concentrations of nitrates and coliforms are acceptably low. Use of chlorinated water in urban areas is acceptable. Use of water known to be contaminated with toxic substances, byproducts of urban, industrial or waste treatment processes is prohibited.	Proposed Action would not affect nitrate or coliform concentration. Analysis indicates that under the Proposed Action it is possible that rotenone may reach one private landowner prior to it being neutralized. This would occur at most for 1 day a year for up to 3 consecutive years. Because neutralization would have been occurring, the concentration level would be lower than the application concentration. If the effect were to occur, it would be for an extremely short duration in a very limited area.
4.5. Sprouts 4.5.1. This annex is intended to complement the	Proposed Action would require meeting regulatory requirements. Analysis indicates that under the

<p>admissibility criteria, authorized materials and methods, and certification procedures, as detailed elsewhere in the standards. It refers both to water grown sprouts and soil grown sprouts.</p> <p>b. Water used for watering and rinsing must be consistent with OCIA processing water standards. It must meet government regulations, e.g. potable water.</p>	<p>Proposed Action it is possible that rotenone may reach one private landowner prior to it being neutralized. This would occur at most for 1 day a year for up to 3 consecutive years. The water right in this area is for livestock watering, not drinking water.</p>
<b>Standards relating to potassium permanganate</b>	<b>Potential effect</b>
<p>3.0 Animal Certification Standards</p> <p>3.9 Herd Health</p> <p>3.9.2 Cleaning agents and disinfectants should be chosen from among soaps, biodegradable detergents, iodine 5%, 1% potassium permanganate solutions, lye, alkali carbonates, caustic potash, lime, hydrogen peroxide, and bleach.</p>	<p>Proposed Action application of potassium permanganate would be 2 to 4 times application of rotenone. At maximum application of rotenone, this would be 400 to 800 ppb, which is equivalent to .004% to .008% potassium permanganate.</p>
<p>9.0 Materials List</p> <p>9.3 Crop Production Materials List</p> <p>Manganese Products, prohibited</p> <p>Class: Fertilizers, Plant Foods, and Soil Amendments (F)</p> <p>Status: Prohibited (P) - materials may not be used on land in the certification program, or in the production of any crops grown on land in the certification program. At least three years must pass after the use of any prohibited substances before land, which has received that substance, may be certified.</p> <p>Manganese chloride, manganese nitrate, and potassium permanganate are prohibited. See 'Micronutrients, synthetic, prohibited'.</p>	<p>Chemical would not be applied for this purpose. Chemical would not be applied to soil or plants. At maximum, application would be equivalent to .004% to .008% potassium permanganate.</p>

Of the USDA standards, 9 could potentially pertain to the Proposed Action. None would be affected, as described in Table 4.



**Table 4. USDA standards that could potentially be affected by the Proposed Action.**

<b>Standard that could be affected</b>	<b>Potential effect</b>
<p>§205.202 Land requirements Any field or farm parcel from which harvested crops are intended to be sold, labeled, or represented as “organic,” must: Have been managed in accordance with the provisions of §§205.203 through 205.206; Have had no prohibited substances, as listed in §205.105 applied to it for a period of 3 years immediately preceding harvest of the crop; and Have distinct, defined boundaries and buffer zones such as runoff diversions to prevent the unintended application of a prohibited substance to the crop or contact with a prohibited substance applied to adjoining land that is not under organic management.</p>	<p>The Proposed Action would not determine how private landowners manage nutrient and fertility products, stock, crop rotation, or pests. Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on the lists or prohibited substances referenced in §205.105.</p>
<p>§205.270 Organic handling requirements Nonagricultural substances allowed under §205.605 and nonorganically produced agricultural products allowed under §205.606 may be used. . . The handler of an organic handling operation must not use in or on agricultural products intended to be sold, labeled, or represented as “100 percent organic,” “organic,” or “made with organic (specified ingredients or food group(s)),” or in or on any ingredients labeled as organic: . . . A volatile synthetic solvent or other synthetic processing aid not allowed under §205.605. . . .</p>	<p>Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on the §205.605 or §205.606 lists.</p>
<p>§205.272 Commingling and contact with prohibited substance prevention practice standard The handler of an organic handling operation must implement measures necessary to prevent the commingling of organic and nonorganic products and protect organic products from contact with prohibited substances.</p>	<p>The Proposed Action would not affect handling operations. Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on the §205.602 or §205.604 lists of prohibited substances.</p>
<p>§205.601 Synthetic substances allowed for use in organic crop production.</p>	<p>Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on this list.</p>
<p>§205.602 Nonsynthetic substances prohibited for use in organic crop production</p>	<p>Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on this list.</p>
<p>§205.603 Synthetic substances allowed for use in organic livestock production</p>	<p>Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on this list.</p>
<p>§205.604 Nonsynthetic substances prohibited for use in organic livestock production.</p>	<p>Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on this list.</p>
<p>§205.605 Nonagricultural (nonorganic) substances allowed as ingredients in or on processed products labeled as “organic” or “made with organic (specified ingredients or food group(s)).”</p>	<p>Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on this list.</p>
<p>§205.606. Nonorganically produced agricultural products allowed as ingredients in or on processed products labeled as “organic.”</p>	<p>Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on this list.</p>

Because the Utah Agriculture and Food organic standards (Utah Administrative code R68-20-1) adopted and incorporated by reference “CFR, June 7, 2006 edition, Title 7 Part 205, National Organic Program Final Rule,” which were the USDA standards at that time, amendments to the National Organic Program issued after June 7, 2006, were reviewed. No changes were made that would alter the determination made above for organic certification under the current USDA National Organic Program; therefore, the Proposed Action would have no effect on organic certification under the Utah organic standards.

*Non-chemical Treatment alternative*

The Non-chemical Treatment alternative would have no effect on the OCIA standards relating to rotenone or potassium permanganate. The effects relative to the OCIA standards relating to water quality would be as described in Table 5.

Table 5. OCIA standards that could potentially be affected by the Proposed Action.

Standard potentially affected	Potential effect
4.4 Shiitake and Oyster Mushrooms 4.4.5 Water Well, stream and pond water used for soaking logs and blocks must be tested to determine if concentrations of nitrates and coliforms are acceptably low. Use of chlorinated water in urban areas is acceptable. Use of water known to be contaminated with toxic substances, byproducts of urban, industrial or waste treatment processes is prohibited.	The Non-chemical Treatment alternative would not affect water quantity, and would add no substances or chemicals; therefore, it would not affect nitrate or coliform concentration.

The Non-chemical Treatment alternative would have no effect on USDA standards relating to application of chemicals. The effects relative to USDA standards relating to water quality would be as described in Table 6.

Table 6. USDA standards that could potentially be affected by the Non-chemical Treatment alternative.

Standard potentially affected	Potential effect
<p>§205.202 Land requirements Any field or farm parcel from which harvested crops are intended to be sold, labeled, or represented as “organic,” must: Have been managed in accordance with the provisions of §§205.203 through 205.206; Have had no prohibited substances, as listed in §205.105 applied to it for a period of 3 years immediately preceding harvest of the crop; and Have distinct, defined boundaries and buffer zones such as runoff diversions to prevent the unintended application of a prohibited substance to the crop or contact with a prohibited substance applied to adjoining land that is not under organic management.</p>	<p>Non-chemical Treatment alternative would not determine how private landowners manage nutrient and fertility products, stock, crop rotation, or pests. No chemicals, thus no prohibited substances, would be applied under the Non-chemical treatment alternative.</p>

No changes to the rules were made after June 7, 2006, that would alter the determination made above for organic certification under the current USDA National Organic Program; therefore, the Non-chemical Treatment alternative would have no effect on organic certification under the Utah organic standards.

## ***Beekeeping***

### *No Action*

The Forest does not know how many beekeeping businesses are in Boulder. Because the No Action alternative would not make any changes to the environment, there would be no potential effects on beekeeping businesses in Boulder, Utah.

### *Proposed Action*

Honey bees may be exposed to the liquid formulation of rotenone in the project treatment area, including approximately 0.25 to 0.5 miles below the neutralization sites through which the rotenone may not have been fully oxidized by the potassium permanganate or degraded naturally. Honey bees may forage 5 to 7 miles with possible longer records, although optimal foraging distance may be less than maximum (Ribbands 1951). If the treatment area provides the best sources or location of pollen and nectar at the time of treatment, honey bee exposure to chemicals from the Proposed Action would be for 1 day per year for at most 3 consecutive years. According to the EPA review of effects of rotenone on honey bees, rotenone is “classified as “practically non-toxic to honey bees on an acute contact and oral exposure basis” (EPA 2006). With the limited time of exposure and “practically non-toxic” nature of rotenone relative to honey bees, the effects to honey bees and, thus, beekeeping businesses would be practically non-existent.

### *Non-chemical Treatment alternative*

The Non-chemical Treatment alternative includes no chemical application. Potential disturbance to riparian vegetation may occur as crews move up the streambanks and electrofish along edges; however, this effect would be short-term and minimal, because the vegetation would be expected to recover quickly and other vegetation in the area would be available for the honey bees. Overall, the Non-chemical Treatment alternative would have no effects on honey bees and, thus, no effects on beekeeping businesses in Boulder, Utah.

### ***Environmental Consequences - Cumulative Effects***

#### *No action*

For the No Action alternative, there would be no direct or indirect effects; therefore, there would be no cumulative effects.

#### *Proposed Action and Non-chemical Treatment alternative*

Neither the Proposed Action nor Non-chemical Treatment alternative would influence the three major factors identified in the 2009 Boulder Town General Plan as the reason for the increased tourist visitation to the area – completion and All-American Highway designation of Utah Highway 12, “world-class scenery of the area,” and Garfield County’s “mapping and promotion of OHV/ATV trails will further attract tourists to utilize designated motorized trails on [the Grand Staircase-Escalante National Monument] and Dixie National Forest lands around Boulder.” Neither action alternative would affect the designation of Utah Highway 12, the scenery of the area, nor Garfield County’s promotion of OHV/ATV trails. Although the Proposed Action and Non-chemical Treatment alternative would result in short-term effects on the pristine character of the area, the existing character of the area already includes multiple human alterations and disturbances that would preclude the area from meeting the dictionary definition of *pristine*; therefore, there would be no effects on the tourist-based businesses based on the perception that the area would move from a pristine character to one that is not. Because there would be no changes that would influence the major factors identified in the 2009 Boulder Town General Plan that would affect businesses in Boulder, there would be no cumulative socioeconomic effects from the Proposed Action or Non-chemical Treatment alternative.

### ***Design Criteria or Mitigation***

No design criteria or mitigation are recommended.

## ***Summary***

The No Action alternative would have no environmental effects; therefore, it would have no direct effects on the pristine character of the landscape. The existing condition is that the landscape has had numerous other activities that would not be considered pristine, per the dictionary definition of *pristine*. The No Action alternative would have no indirect effects to the social values, including the spiritual, cultural, or psychological values, of some or all of the residents of Boulder. The No Action alternative would also have no indirect effects on the tourist-based businesses in Boulder, no indirect effect on the ability of Boulder Town to meet its vision or goals as described in its 2009 General Plan, no indirect effect on the ability of irrigators of Boulder Town to meet organic certification standards, and no indirect effect on beekeeping businesses.

The Proposed Action would have short-term environmental effects on the pristine character of the landscape and, thus, may result in short-term changes that could impact social values, including spiritual, cultural, or psychological values, of some or all of the residents of Boulder, estimated at 189 in 2009. Also, based on 2008 business data, most recent available, if changes to the landscape were to affect tourist-based businesses, out of 17 total businesses the Proposed Action could affect up to 4 businesses in the Accommodation and Food Service industry, 3 in the Retail Trade industry, and 3 in the Arts, Entertainment, and Recreation industry. This could possibly affect up to 39 employees, which would represent 21 percent of the population, based on 2008 population estimates, if all of the employees were from Boulder. Extreme effects are not expected, based on minimal changes that have occurred since implementation of a similar rotenone treatment in West Fork Boulder Creek in 2000 and 2001. The Proposed Action would not affect the ability of Boulder to meet its vision or goals, except that there would be short-term disturbance to the “quiet” lifestyle. The Proposed Action would have no effects on the ability of downstream irrigators to meet organic certification standards or local beekeeping businesses.

The Non-chemical Treatment alternative would have similar effects to the Proposed Action. It would have longer-term effects on the “quiet lifestyle” of the Boulder vision and goals because of the higher overall effort (number of people X number of implementation days) and longer duration of the project. It would not include chemical additions to the water. The Non-chemical Treatment alternative would have no effects on the ability of downstream irrigators to meet organic certification standards or local beekeeping businesses.

## ***Compliance with Other Laws and Regulations***

None of the alternatives would affect either the Forest Service or Boulder’s ability to comply with laws and regulations.

## ***Forest-plan Consistency Determination***

None of the alternatives affects Forest Service outputs of goods or services or management area emphasis.

## ***Use and/or Consideration of Best Available Science***

This analysis considers the best available science relative to effects of the proposed alternatives on the environment, as discussed in this and other specialist reports. The analysis uses the best available public data and the Boulder Town General Plan to characterize the local economy of Boulder, Utah, and influence of tourists on that economy. The analysis uses the latest version of standards for organic certification.

It is acknowledged that there may be incomplete or unavailable information, scientific uncertainty, and risk associated with the analysis included in this report and that there may be opposing views. Because of this, much of the analysis is based on extreme effects to ensure bracketing the real potential effects of the alternatives.

## ***Literature Cited***

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Figure A. Proximity of project area to Boulder, Utah

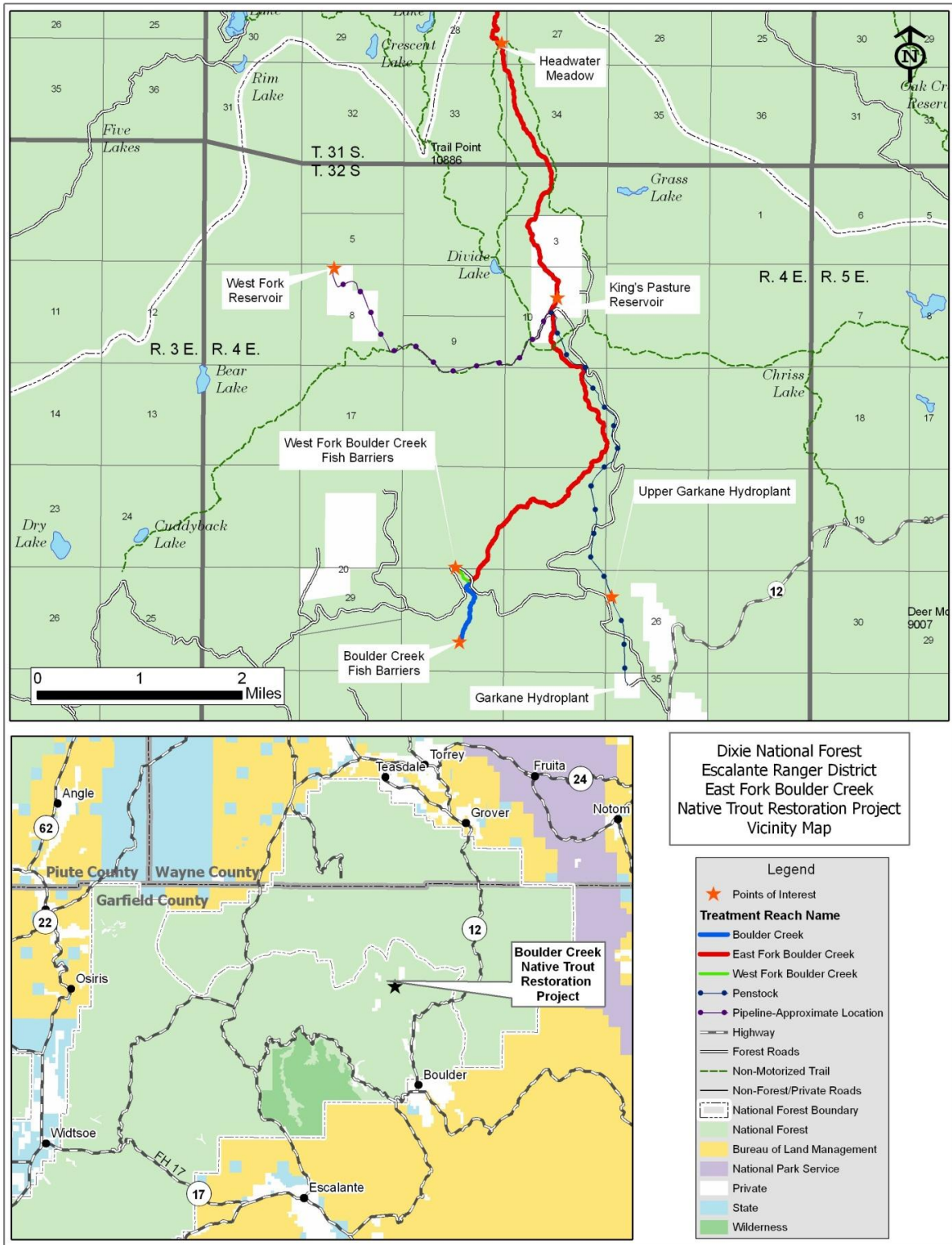
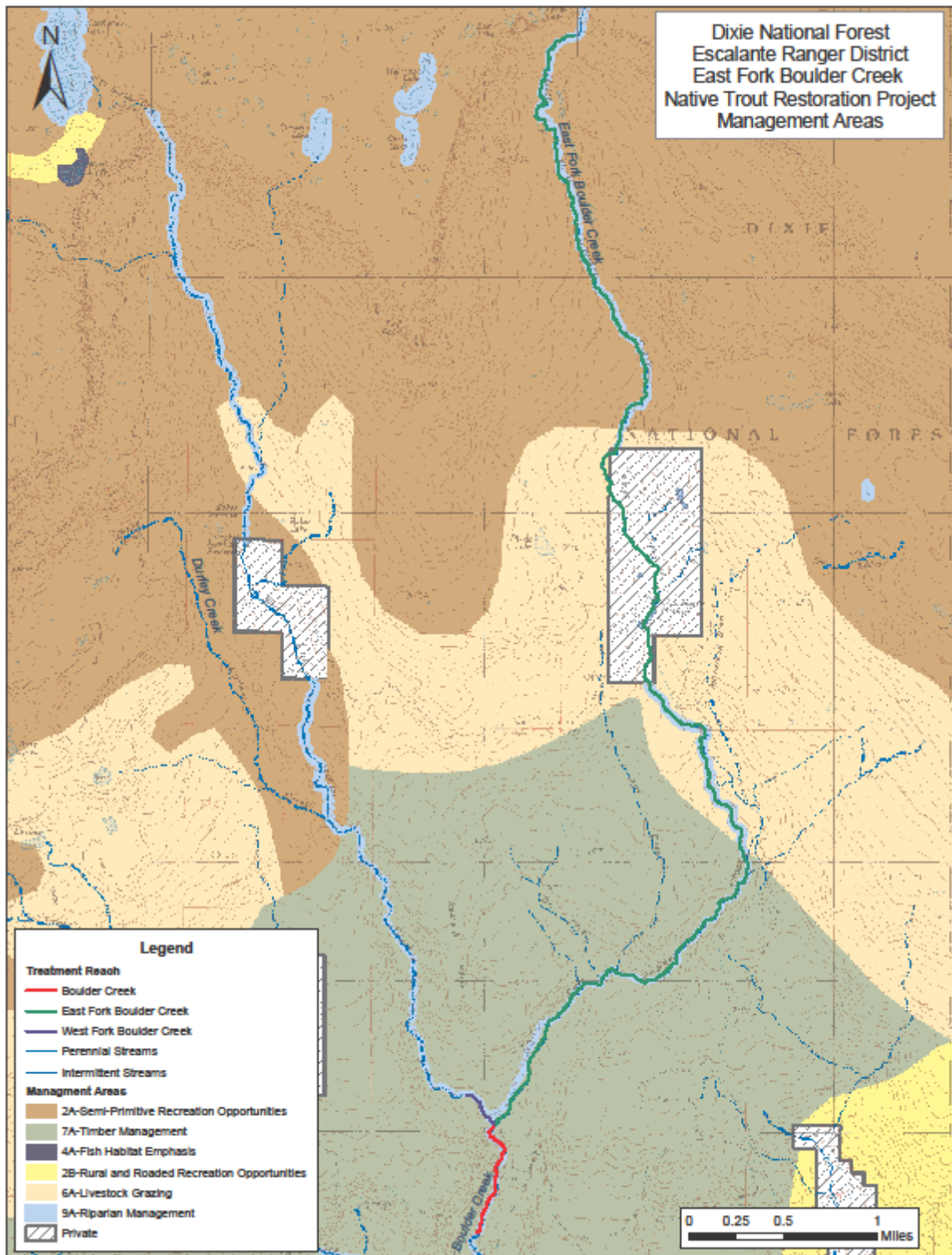


Figure 2. Management Areas around project area





## **Appendix 1. Project Area and Alternatives Analyzed in Detail**

The following describes and compares the Forest Service alternatives analyzed. It includes a description of the UDWR's proposed project and considers UDWR's treatment alternative in detail. This section also presents the alternatives and the UDWR activities that would be authorized or connected actions to the alternatives in comparative form.

### *Project Area*

The proposed East Fork Boulder Creek Native Trout Restoration Project (project) is located approximately 7 miles northwest of Boulder, Utah (see Figure 1). The total treatment area is as follows:

- approximately 7.8 miles (12.6 km) of East Fork Boulder Creek from the natural barrier (below headwater meadow) on East Fork Boulder Creek to its confluence with West Fork Boulder Creek;
- approximately 0.2 miles (0.4 km) of lower West Fork Boulder Creek, from a previously constructed barrier to its confluence with East Fork Boulder Creek;
- approximately 0.5 miles (0.8 km) of Boulder Creek from the confluence of East Fork Boulder Creek and West Fork Boulder Creek downstream to a previously constructed fish barrier;
- all seeps and springs flowing into those sections of streams proposed for fish removal; and
- the Garkane Energy water transfer pipeline between the West Fork Reservoir and King's Pasture Reservoir; King's Pasture (East Fork) Reservoir; a pond on private property in King's Pasture, and the Garkane Energy penstock, between King's Pasture Reservoir and the Garkane Energy Boulder Creek Hydroelectric Power Plant (main power plant).

The treatment stream reaches flow through portions of Sections 27, 28, 33, and 34 of T31S, R4E, and Sections 3, 10, 15, 21, 22, and 28 of T32S, R4E, Salt Lake Baseline Meridian. Treatment would include connecting waters, including relatively large inflows or tributaries with permanent fish habitat and smaller springs and seeps that are capable of at least temporarily holding small fish. Known tributaries and inflows vary in length from 10 meters to over 750 meters.

The reaches on NFS-lands are all on the Escalante Ranger District of the Forest in Garfield County, Utah. The inflow of the water transfer pipeline is at the West Fork Reservoir in Section 8, T32S, R4E, and the outflow is at King's Pasture Reservoir in Section 10 of T32S, R4E. The inflow of the penstock is at King's Pasture Reservoir, and the outflow is at the main power plant in Section 35 of T32S, R4E.

### *No Action- No Further Treatment Scenario*

Under the No Action alternative, the Forest would not approve the pesticide use permit to UDWR, would not authorize UDWR to use motorized vehicles off of designated routes for the application of rotenone to waters of the treatment area on NFS lands, and would not approve a special use authorization for UDWR to bury removed fish.

The No Action alternative would not preclude UDWR from implementing actions on NFS lands that would meet the purpose and need for UDWR's project but do not require Forest Service authorization. This includes UDWR activities described under the Non-chemical Treatment alternative (Section 2.1.3) except for the use of motorized vehicles off of designated routes or burial of removed fish on NFS lands. The No Action alternative would also not preclude UDWR from implementing actions on non-NFS lands that are related to the purpose and need for UDWR's project but not under Forest Service jurisdiction or authorization.

One possible option for UDWR is to take no further action to meet the purpose and need of the proposed project. This possible option is identified in this analysis as the "No Action - No Further Treatment Scenario" and is the basis for the effects analysis for the No Action alternative to provide the base line for comparison of expected future conditions if neither the Proposed Action nor Non-chemical Treatment alternative were implemented by the Forest and UDWR were to take no further action to meet the purpose and need.

#### *Proposed Action*

The Proposed Action is to approve the pesticide use permit that the Forest Service requires the UDWR to have to apply the fish toxicant rotenone to waters that flow on NFS lands and to authorize motorized vehicle use off of designated routes. The pesticide use permit would authorize the UDWR to implement a maximum of three treatments on NFS land, one treatment per year for three consecutive years. Waters on NFS land that would be treated by UDWR under the Forest Service pesticide use permit are as follows:

- approximately 7.8 miles (12.6 km) of East Fork Boulder Creek from the natural barrier (below headwater meadow) on East Fork Boulder Creek to its confluence with West Fork Boulder Creek;
- approximately 0.2 miles (0.4 km) of lower West Fork Boulder Creek, from a previously constructed barrier to its confluence with East Fork Boulder Creek;
- approximately 0.5 miles (0.8 km) of Boulder Creek from the confluence of East Fork Boulder Creek and West Fork Boulder Creek downstream to a previously constructed fish barrier; and
- all seeps and springs flowing into those sections of the stream reaches specified in the permit.

The UDWR activities that would be authorized by the Forest under the Proposed Action would completely eradicate non-native trout from East Fork Boulder Creek, a short segment of Boulder Creek, and a very short segment of West Fork Boulder Creek. All fish would be temporarily eliminated by UDWR from target waters. Use of motorized vehicles by UDWR off of designated routes may be needed to facilitate placement of equipment, especially neutralization equipment, in effective locations.

Several actions that are not part of the Forest Service decision are connected to the UDWR project, as follows. UDWR is proposing chemical treatment of connected waters on private property to meet the purpose of the UDWR project. Following fish removal, UDWR would introduce the CRCT into the treated stream segments to establish self-sustaining populations. Sterile hybrids of species of non-native trout may also be stocked by UDWR at some locations following the treatments to provide sport fishing

opportunities while native trout become established. The following describes the UDWR project in detail, including identification of those actions that do not require Forest Service authorization.

*Chemicals.* Liquid emulsifiable rotenone (Liquid Rotenone, 5% Active Ingredient, EPA Registration No. 432-172) would be used by UDWR to treat target waters. Rotenone was selected as the chemical to use because of its effectiveness in controlling fish populations and its lack of long-term effects on the environment (Sousa et al 1987). When used at the concentrations planned for the UDWR project, rotenone is a naturally occurring fish toxicant that is toxic to only fish, some aquatic invertebrates, and some juvenile amphibians. EPA found it to be not toxic to humans, other mammals, and birds at the concentrations used to remove fish (EPA 2007). It has been widely used in the United States since the 1950's. UDWR has used rotenone successfully in many similar projects and has refined application techniques to minimize adverse side effects to the environment (Hepworth et al. 2001a, Hepworth et al. 2001b, Hepworth et al. 2001c, Ottenbacher and Hepworth 2001, Chamberlain and Hepworth 2002a, Chamberlain and Hepworth 2002b, Chamberlain and Hepworth 2002c, Fridell et al. 2004, Fridell et al. 2005, Fridell and Rehm 2006).

Potassium permanganate would be used by UDWR to neutralize the rotenone at suitable locations to prevent the movement of rotenone into non-target waters. Potassium permanganate was selected, because it is a strong oxidizer that breaks down into potassium, manganese, and water. All are common in nature and have no deleterious environmental effects at the concentrations that would be used for the UDWR project activities, including those that would be authorized by the Forest under the Proposed Action (Finlayson et al. 2000). Potassium permanganate is used as an oxidizing agent in treatment plants to purify drinking water (EPA 1999). Although the oxidation process is not immediate, neutralization should occur within an estimated 0.25 to 0.5 miles of the neutralization site.

A more detailed description of the chemicals that would be used for the UDWR project activities, including those that would be authorized by the Forest under the Proposed Action, can be found in specialist report on Chemicals and Application of the Proposed Action.

*Application.* Liquid rotenone would be applied by UDWR at a rate of 0.5 to 2.0 ppm. In the pond and reservoir, liquid rotenone would be dispersed from personnel on small water-craft using pressurized backpack spray units. For flowing waters, seeps, and springs, liquid rotenone would be applied using a combination of 30 gallon and 5 gallon dispensers with constant flow drip-heads at approximately 50 to 60 stations throughout the UDWR project area over a 3 to 24 hour period (Finlayson et. al 2000, Ottenbacher et al. 2009). One 30 gallon drip station would be used by UDWR at each at the following:

- lower end of the headwater meadow at the upstream end of the UDWR project area,
- approximately halfway between the headwater meadow and King's Pasture Reservoir,
- immediately below King's Pasture Reservoir, and
- at the intake for the water flow pipeline between the West Fork Reservoir and King's Pasture Reservoir.

Five-gallon drip stations would be located by UDWR at approximately 1 mile intervals, beginning one mile below King's Pasture Reservoir and ending 1 mile upstream from the fish barriers on the main stem of East Fork Boulder Creek, and at all major springs and seeps within the UDWR project area. The

interval placement of drip stations on the main stem of East Fork Boulder Creek would be to facilitate efficient travel time of chemicals. Depending on flow volume, a single 30 gallon or 5 gallon drip would be placed by UDWR on the lower fish barrier on West Fork Boulder Creek. Pressurized backpack sprayers would be used by UDWR to apply a diluted solution of the chemical to springs and backwater areas containing fish that were not effectively treated by boat or drip station.

Rotenone would be neutralized by UDWR with potassium permanganate downstream from target waters. Three sites are planned: where the penstock water is released at the upper power plant, where water is released at the main power plant, and at the fish barrier at the lower end of the treatment area. Each site would have a main neutralization station and at least one contingency neutralization station to ensure effectiveness. The neutralization stations would prevent rotenone from escaping the target area, except for the estimated 0.25 to 0.5 miles downstream in which the neutralization or natural degradation of rotenone would be occurring.

*Post-treatment activity.* Following confirmation of complete non-native trout removal, UDWR would reintroduce CRCT into project stream reaches from “core” CRCT populations or from fish produced by UDWR CRCT brood stocks. Sterile hybrids of species of non-native trout may also be stocked by UDWR at some locations following the treatments to provide sport fishing opportunities while native trout become established. All UDWR transfers or stocking of fish would comply with Utah Department of Agriculture and Food rules and UDWR policies.

*Design Criteria.* The following design criteria would be implemented and included in the Forest Service authorizations:

1. Stream sections will be treated in the fall to minimize impacts on non-target wildlife species (amphibians, insectivorous birds and bats). The fall treatment period will also minimize the impacts on sport fishing recreation.
2. Each treatment will be preceded by internal and external notifications and media releases to notify the public of treatment sites and dates and will include the following: notification of the Boulder Town Council, notification of private landowners in the treatment area, and news releases in local papers.
3. The treatment area will be placarded to prohibit public access during treatment and for at least 3 days following treatment.
4. Application of the chemical will be conducted by licensed pesticide applicators in accordance with all applicable regulations and policies.
5. Access by motorized vehicles will be on National Forest System roads designated for motorized vehicle use to the extent possible. Any use of motorized vehicles off of designated routes will be minimal and will require written Forest Service approval.
6. Neutralization sites will be placed to maximize their effectiveness at preventing downstream escapement of rotenone.
7. Treated waters will remain open to fishing.

8. Transport to the site and storage of chemicals on the site will comply with FSH 2109.14.40 (Pesticide-Use Management and Coordination Handbook, Chapter 40 - Storage, Transportation, and Disposal).
9. Sentinel fish (“in situ bioassay”) will be used for pesticide residues monitoring to determine the presence or absence of unacceptable environmental effects.
10. Treatments will be discontinued if the objective of complete removal of non-native trout from the project area has been met.

*Actions connected to but not included in the decision.* The following parts of the UDWR project, as described above, are not subject to Forest Service permit requirements, and therefore are not included in the Forest Service decision. Selection of the Proposed Action is for issuance of the pesticide use permit for the application of rotenone on NFS lands only. The following, however, are considered connected actions and thus included in the environmental analysis:

1. The proposed UDWR treatment area includes private property, including property owned by Garkane Energy; thus, this area is not under Forest Service jurisdiction. This includes approximately 1.4 miles of East Fork Boulder Creek, Kings Pasture Reservoir, and the pond in Kings Pasture. To meet the purpose and need of the UDWR project, these areas as well as the water in the transmission pipeline and penstock must be treated by UDWR. Forest Service approval of the pesticide use permit for UDWR to apply rotenone to waters on NFS land is not approval of UDWR activities on non-NFS lands; however, the Forest Service would not approve the pesticide use permit unless UDWR is able to complete its project by treating waters off of NFS land.

The expectation is that the entire UDWR project treatment area would receive chemical treatment as described below, although the UDWR may decide to use another method or methods to achieve the treatment objective. FERC license order Section 4(e), item 16, condition 4, requires Garkane Energy to use its reasonable efforts to cooperate in the work of UDWR and other agencies to remove non-native fish and re-establish CRCT in the above stream sections. This cooperation has already been demonstrated through construction of the fish barriers and through the first chemical treatment of Kings Pasture Reservoir in 2009.

2. Stocking of fish is under the jurisdiction of UDWR; thus, the CRCT stocking is not under Forest Service jurisdiction. To meet the purpose and need of the UDWR project, the stream would need to be stocked by UDWR with CRCT from core populations or UDWR brood stock post-treatment.

The expectation is that the post-treatment recolonization/stocking of CRCT would occur as described. The purpose and need for the UDWR project, including stocking with CRCT, is to implement conservation actions under the CRCT Conservation Agreement and Strategy, to which UDWR is a signatory. In addition, the Forest Service conditions regarding the non-native fish eradication and fish restocking were included in a 2006 settlement agreement relating to the FERC license conditions and signed by Garkane Energy, Forest Service, and UDWR.

3. Fishing regulations, including whether or not treated waters would remain open to fishing, is under the jurisdiction of UDWR.

The expectation is that UDWR would manage the fishing regulations to meet the conservation actions under the CRCT Conservation Agreement and Strategy. UDWR recognizes the importance of the area to recreation users. Because of this, UDWR may also stock sterile hybrids of species of non-native trout at some locations following the treatments while native trout become established.

#### *Non-chemical Treatment Alternative*

Under the Non-chemical Treatment alternative, the Forest Service would authorize UDWR to use motorized vehicles off of designated routes and approve a special use authorization for UDWR to bury fish that are removed as necessary to implement a non-chemical treatment to remove non-native trout from waters on NFS land.

The non-chemical treatment methods would not involve the use of rotenone or other pesticides on NFS lands and, therefore, would not require Forest Service approval. The effects of the non-chemical treatment are being analyzed, because this option may be exercised by UDWR in the event that the Forest Service were to choose not to authorize pesticide use, and the approach would be a connected action to the authorization of the use of motorized vehicles off of designated routes and approval of a special use authorization for burial of removed fish. The other connected actions that would also not require new Forest Service action are described below. UDWR's non-chemical treatment and other connected actions may or may not occur under the No Action alternative if the UDWR were to use motorized vehicles only on designated routes. These UDWR actions also may or may not occur under the Proposed Action.

Under the Non-chemical Treatment alternative, UDWR would use electrofishing to remove non-native trout from the treatment waters on NFS lands. Except for possible motorized vehicle use off of designated routes and burial of removed fish, this alternative would not require Forest Service authorization.

*Treatment area.* The treatment area would remain the same as described in the Proposed Action.

*Methodology and Equipment.* Electrofishing would be used by UDWR to remove non-native trout from the treatment area on NFS lands. Electrofishing introduces an electric current into the water and is commonly used as a fish removal method. The electricity causes an involuntary muscle contraction in the fish, attracting them toward the source of the electricity (electrode). Workers with long-handled nets then collect the stunned fish. Voltage, amperage, pulse frequency, and waveform are manipulated to maximize effectiveness, which can be influenced by water flow and velocity, temperature, clarity, conductivity (dissolved mineral content), and substrate. Other factors influencing effectiveness include the fish size, species and behavior, presence of aquatic vegetation, time of year, and time of day. It is most effective in shallow water and is, therefore, most commonly used in rivers and streams and occasionally in the shallow water zones of lakes.

Electrofishing removal would be accomplished by UDWR using multiple Smith-Root LR24 backpack electrofishing units or their equivalent from another manufacturer. Block nets of sufficient width would be set up to prevent fish emigration during removal activities. Dip nets, buckets, and live wells would also be necessary for capture and removal of brook trout (*Salvelinus fontinalis*) and capture and safe holding of CRCT.

*Removal activities.* Mechanical removal of non-native trout species using backpack electrofishing has been attempted in several other projects (Moore et al. 1986, Meronek et al. 1996, Thompson and Rahel 1996, Buktenica et al. 2000, Kulp and Moore 2000, Shepard et al. 2002, Peterson et al. 2004, Moore et al. 2005, Meyer et al. 2006, Earle et al. 2007). The results of these prior mechanical removal projects indicate: 1) achieving complete mechanical removal of trout in streams with the width, complexity, and number of small, heavily vegetated springs/tributaries found in East Fork Boulder Creek would be difficult; 2) success would be enhanced by implementing multiple-pass depletion removal efforts 3 to 4 times within the same year, and 3) success would be enhanced by treatment over multiple years (minimum of 2). For this UDWR project, the multi-year removal effort would involve a minimum of 5 to 6 people conducting multiple-pass removal efforts for the majority of summer and early autumn (late June to September) over a period of several years. While such removal efforts would undoubtedly cause major reductions in brook trout density and biomass, they may or may not result in complete eradication. UDWR would begin CRCT reintroduction efforts only when no brook trout are found within the project area.

The electrofishing removal by UDWR would follow the population monitoring methods used by Utah State University's Institute for Natural Systems Engineering, Utah Water Research Lab (INSE) during their Garkane-funded fish population monitoring on the Boulder Creek system (Hardy et al. 2009a, Hardy et al. 2009b). Personnel would electrofish approximately 100-meter reaches in 8.5 miles of the mainstem of East Fork Boulder Creek, West Fork Boulder Creek, and Boulder Creek along with all spring inflows and tributary streams. A block net would be placed across the upstream and downstream end of each reach to increase capture efficiency by preventing emigration. Up to 4 passes, or until no fish were collected, would be completed through each reach. Each pass would involve all personnel walking in the stream channel and on the banks while applying constant electric current to the water from at least two backpack electrofishers. All organisms within the stream would be subjected to the electric field. All non-native brook trout would be removed from the system, killed and buried. Any CRCT collected would be held in buckets/live wells and returned to the stream after completion of the 4 pass removal.

*Effort.* One crew would consist of at least 2 personnel using backpack electrofishers, 2 netters retrieving stunned fish, and 1 person with a bucket receiving and disposing of fish. Electrofishing batteries would be recharged using small gasoline powered generators. Based on their previous monitoring efforts, INSE estimated that in a 40 hour work week, 9 sites that were each 100 m long could be completed by a 5 to 6 person crew using the four pass methodology (C. Williams, Institute for Natural Systems Engineering, personal communication with M. Golden, Dixie National Forest, 3/12/2010). Based on this INSE estimate, for UDWR fish removal activities under the Non-chemical Treatment alternative, one removal effort on the 11.5 km mainstem stream (12.8 reaches, 900 m long) on NFS land would require approximately 512 hours (12.8 reaches times 40 hours) or 63 days (8 hours per day) to be completed by a 5 to 6 person crew using the four pass method. An additional effort of approximately 13 days would be needed to treat the 2.3 km mainstem on private property.

Because UDWR's removal activities would need to occur between late-June or early July and September to minimize access, weather, and high stream flow issues, each removal effort would be limited to approximately 20 days to be able to conduct 4 removal efforts in a single year. To be able to treat the entire mainstem stream, on NFS lands and private lands, during any one removal effort, 20 people (four 5-person crews) would be needed. For four removal efforts, this would total up to 80 days per year. As described below, UDWR may need up to 10 years of removal effort under this method.

During the UDWR's 2009 chemical treatment of East Fork Boulder Creek above King's Pasture Reservoir, 23 relatively large inflows or tributaries with permanent fish habitat were identified, along with many smaller springs and seeps capable of at least temporarily holding small fish. These tributaries and inflows varied in length from 10 m to over 750 meters. Additional inflows and tributaries that contain fish habitat are probably present in the reach below Kings Pasture and could add another 30 days or more to the estimated treatment time.

Efficiency of fish removal by electrofishing is substantially lower in certain types of habitats found in the treatment area, especially those with heavy aquatic vegetation, root wads, woody debris, and boulder fields. The time for one removal effort in these types of areas could be higher, and effectiveness could be lower. Also, in order to eliminate the possibility of fish moving between treated and untreated reaches, crews would need to operate simultaneously, which may negatively impact fish-removal efficiency, as stream bed disturbance from upstream crews would impact water clarity and visibility for downstream crews. Because of reduced removal efficiency with electrofishing as the fish removal method, the UDWR project may extend to 10 years.

*Post-Fish Removal activities.* Post-fish-removal activities by UDWR would be the same as those described for the Proposed Action.

*Design Criteria.* The following design criteria would be included in the written authorization for use of motorized vehicles off of designated routes and the special use authorization for the burial of removed fish:

1. State of Utah decontamination protocols for prevention of the spread of Aquatic Nuisance Species will be followed for all gear and personnel involved with the removal project.
2. The Forest Archaeologist will be consulted about potential locations to bury fish to avoid impacts to cultural resources.
3. Dead fish collected will be buried no closer than 300 feet from the stream and away from known camping areas to minimize bear/human interactions.
4. Access by motorized vehicles will be on National Forest System roads designated for motorized vehicle use to the extent possible. Any use of motorized vehicles off of designated routes will be minimal, and will require written Forest Service approval.
5. Trails will be used whenever possible to move from one location to another to minimize soil and vegetation disturbance and to prevent establishing new trails.
6. Sensitive plant habitat will be avoided during action implementation.
7. Personnel will ensure reach being treated is void of livestock and people not involved with the operation. Treated waters will remain open to fishing.

*Actions connected to fish removal actions on NFS lands.* The following parts of the UDWR project, as discussed above, are not subject to Forest Service permit requirements, and therefore are not included in the Forest Service decision. They are considered connected actions to UDWR's fish removal activities on NFS lands and thus included in the environmental analysis:



1. As described for the Proposed Action, the UDWR treatment area includes private property, including that owned by Garkane Energy; thus, this area is not under Forest Service jurisdiction.

The expectation is that under the Non-Chemical Treatment alternative, the UDWR would implement non-chemical treatment methods on non-NFS lands, as described below, although the UDWR may decide to use another method or methods to achieve the treatment objective on the private lands or not pursue treatment on the private lands. The flowing portions of the project area on private lands would undergo similar electrofishing removal by UDWR, as described for NFS lands above.

For the non-flowing portions of the project area on private lands, electrofishing would not be effective in removing brook trout from King's Pasture Reservoir or the pond in Kings Pasture. To remove brook trout from these areas without use of chemicals, UDWR would deploy experimental gill nets with many different mesh sizes at several locations and depths throughout each water body. Other studies where this method has been successful at eradicating brook trout suggest that it would take at least two and up to four seasons of semi-continuous netting to eliminate all size classes of trout from small lakes with relatively low trout densities (Knapp and Matthews 1998, Parker et al. 2001).

2. Potential recolonization from East Fork Boulder Creek would severely reduce the efficacy of removing brook trout from King's Pasture Reservoir; therefore, UDWR would need to construct a fish migration barrier in East Fork Boulder Creek on private property above King's Pasture Reservoir.

The barrier would generally consist of a small check dam constructed of boulders and large rocks, creating a vertical drop of approximately 5 ft on the downstream side. The location for the barrier would be selected by UDWR to utilize any naturally occurring drops which can be enhanced and where the stream channel and floodplain are confined to minimize the size of the structure and the amount of water impounded behind it. Barrier construction would comply with laws, regulations, and permitting requirements of the State Engineer for stream channel alteration. Barrier materials would be taken from the ground surface, near the stream. The collection of these materials would not require excavation, stream alteration, or vegetation disturbance. If sufficient material is not available on site, additional materials would be hauled to the barrier site from an approved source.

The barrier location would be selected by UDWR to minimize changes in stream gradient, hydraulic function, and water pooling. In addition, the barrier would be constructed by UDWR adjacent to existing roads where equipment access is acceptable, thus requiring little disturbance to surrounding areas. Riparian vegetation would be disturbed as little as possible during the construction of the barrier, while areas where surface disturbance would occur would be restored to pre-project conditions. The barrier would not be placed in areas of cultural or historic significance or in areas where sensitive, threatened or endangered plants occur. It would be designed to operate under the natural fluctuations of a stream flow without routine maintenance. The barrier would be designed to pose little, if any, threat to the natural stream system or its associated riparian area so that if it were to fail, no damage would result to the stream environment. UDWR's maintenance could include

the adjustment or replacement of individual rock materials, but such work would be minor. The barrier could be removed but only after treatment is determined to be fully successful.

Neither netting nor electrofishing are options for UDWR for removing any non-native trout that may be using the upper portion of the penstock inflow or the lower portion of the pipeline from the West Fork Reservoir during treatment efforts. Shutting off water to these areas until they were completely dry would be the only way to ensure complete eradication; however, this is not feasible (M. Avant, Garkane Energy, personal communication with M. Golden, Dixie National Forest, 4/1/2010). Because of this, the effectiveness of the rest of the treatment would be reduced, contributing to the likelihood of the longer period of treatment.

3. Stocking of fish by UDWR would be as described for the Proposed Action.
4. As described for the Proposed Action, fishing regulations, including whether or not treated waters would remain open to fishing, is under the jurisdiction of UDWR. The expectation is as described for the Proposed Action.

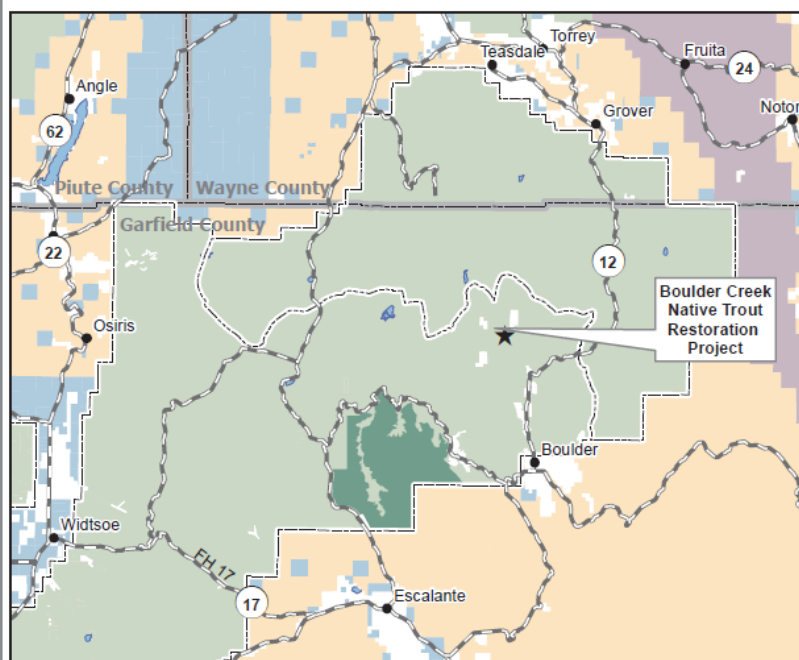
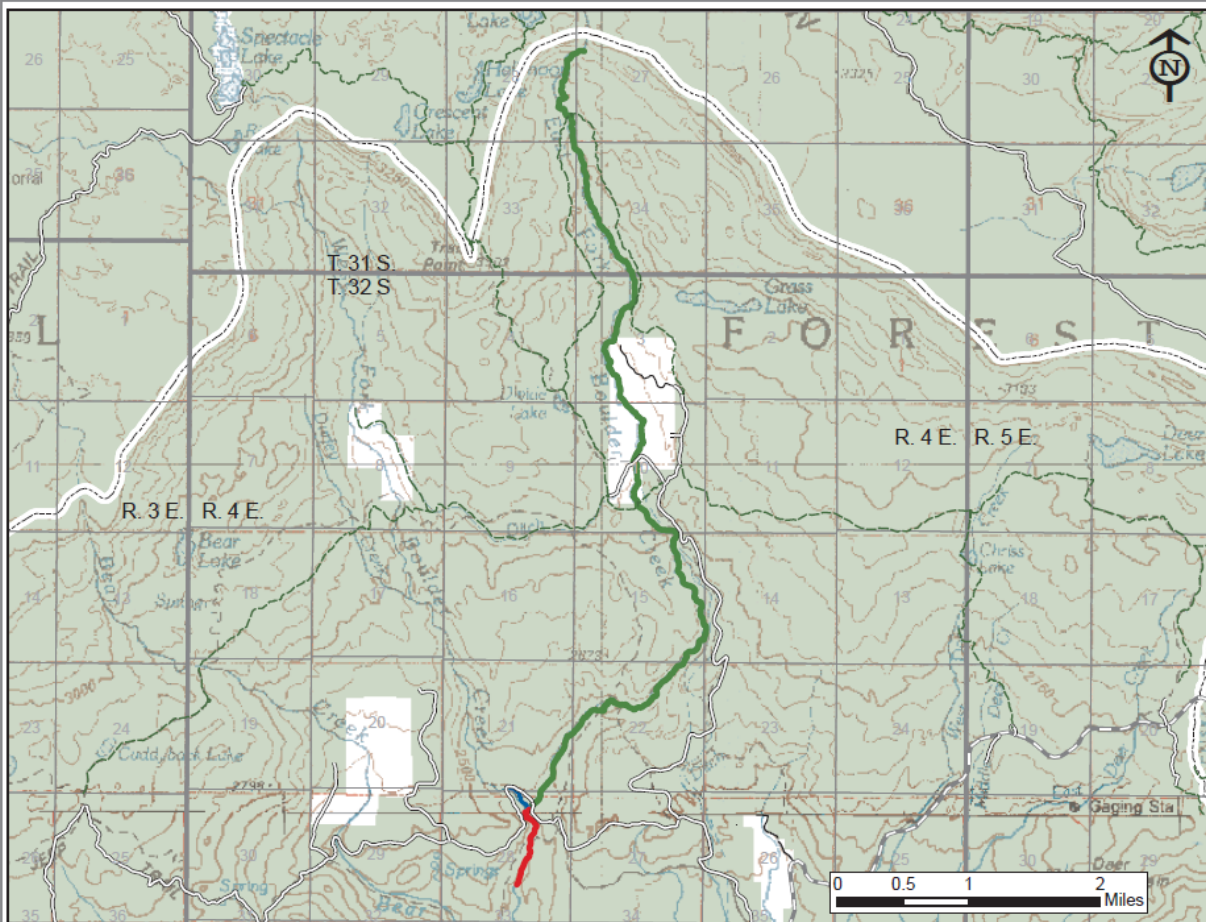
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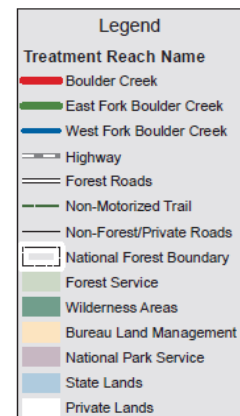
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Figure 1. Project area location



Dixie National Forest  
Escalante Ranger District  
East Fork Boulder Creek  
Native Trout Restoration Project  
Vicinity Map



## **Appendix 2. Past, Present, and Foreseeable Future Activities in the three (HUC 6) watersheds, Headwaters Boulder Creek, Bear Creek – Boulder Creek and Deer Creek surrounding treatment area**

### Past Activities

9,780 acres of past timber sales (Bear Creek, Deer Mountain, Garkane, Side Hollow and Dry Lakes Aspen Timber Sale), harvested within the last 30 years

Approximately 2,500 acres of non-commercial thinning.

Four past fires (Deer Mountain, Short Neck, Steep Creek and Bear Creek), 1,860 acres in the Deer Creek and Bear Creek – Boulder Creek watersheds.

### Present Activities

Livestock (cattle) grazing allotments (Boulder Allotment and Sand Creek Allotment)

Road and trails:

- 42 miles of High Clearance Vehicle Roads
- 1 mile of Suitable for Passenger Cars Road
- 5 miles of Seasonal Closed Roads
- 35 miles of Administrative Roads
- 61 miles of Roads Designated to be Closed
- 39 miles of Non-Motorized Trails
- 17 miles of Highway (Utah Hwy 12)
- 16 miles of Private Roads

Road maintenance (resurfacing to reduce erosion from fire effects) on Forest Road 165 (Kings Pasture Road) and 166 (Hawes Pasture Road)

Bridge construction on Forest Road 166 at East Fork of Boulder Creek

### Foreseeable Activities

Two timber sales/vegetation management project (Sawmill Aspen Vegetation Management (815 acres) and Road Draw Salvage Sale (82 acres))

Appendix 3. Organic Crop Improvement Association International, Inc. (OCIA) International Certification Standards (effective June 1, 2010) pertaining to rotenone, water quality, and potassium permanganate.

OCIA standard	Applicability to Proposed Action
<b>STANDARDS PERTAINING TO ROTENONE</b>	
<b>2.0 Farm Certification Standards</b>	
<p><b>2.10.2 Insects and Similar Pests</b>            Rotenone, pyrethrum, dormant oil (preferably vegetable-based), and diatomaceous earth may be used with great caution due to their high ecological profile.</p>	Chemical would not be applied for this purpose (botanical pesticide). Application would be as minimal as possible while being effective and follow all EPA label requirements.
<b>9.0 Materials List</b>	
<p><b>9.3 Crop Production Materials List</b>            Botanical pesticides –            Class: Invertebrate pesticide (I)            Status: Restricted (R) materials are allowed by OCIA only with certain restrictions and only if no alternatives are feasible. The use of these materials is discouraged. In many cases, the permitted use of these materials is dependent on the specific source, and demonstration that the material is free from contamination. In some cases, there is simply not enough information available about a material.</p> <p>Botanical pesticides must be used in conjunction with a biorational pest management program, and cannot be the primary method of pest control in the Farm Organic System Plan. The least toxic botanicals must be used in the least ecologically disruptive way possible. All EPA label restrictions and directions need to be followed including restrictions concerning crops, livestock, target pests, safety precautions, pre-harvest intervals and work re-entry. The NOSB defines the following as non-synthetic botanical pesticides: neem, pyrethrum, rotenone, ryania, and sabadilla.</p>	Chemical would not be applied for this purpose (botanical pesticide). Application would be as minimal as possible while being effective and follow all EPA label requirements.
<p><b>9.3 Crop Production Materials List</b>            Derris Root            Class: Invertebrate pesticide (I)            Status: Restricted (R)</p>	Chemical would not be applied for this purpose (botanical pesticide). Application would be as minimal as possible while being effective and follow all EPA label requirements.

See Rotenone	
<p>9.3 Crop Production Materials List  Rotenone  Class: Invertebrate pesticide (I)  Status: Restricted (R)</p> <p>Very toxic, use with caution. Toxic to fish and others. Piperonyl butoxide may not be used as a synergist. See 'Botanical Pesticides' for restrictions.</p>	<p>Chemical would not be applied for this purpose (botanical pesticide). Application would be as minimal as possible while being effective and follow all EPA label requirements. Toxicity to fish is purpose of use in Proposed Action. Piperonyl butoxide would not be the synergist.</p>
<p>9.3.1 Livestock Production Materials List  Botanical pesticides -- Class: Invertebrate pesticide (I)  Status: Restricted (R)</p> <p>Botanical pesticides must be used in conjunction with a biorational pest management program, and cannot be the primary method of pest control in the Farm Organic System Plan. The least toxic botanicals must be used in the least ecologically disruptive way possible. All EPA label restrictions and directions need to be followed including restrictions concerning crops, livestock, target pests, safety precautions, pre-harvest intervals and work re-entry. The NOSB defines the following as non-synthetic botanical pesticides: neem, pyrethrum, rotenone, ryania, and sabadilla.</p>	<p>Chemical would not be applied for this purpose (botanical pesticide). Application would be as minimal as possible while being effective and follow all EPA label requirements.</p>
<p>9.4.3 Processing Materials List  Botanical Pesticides  Class: Processing Pest Control (PPC)  Status: Restricted (R) - May be used in direct contact with food or on food contact surfaces with certain restrictions as specified on the list.</p> <p>Botanical Pesticides must be a part of a biorational pest management program, and cannot be the primary method of pest control. The least toxic botanicals must be used in the least ecologically disruptive way possible. All EPA label restrictions and directions need to be followed including restrictions concerning target pests, safety precautions, and worker reentry. Botanicals are defined as neem, pyrethrum, rotenone, ryania, and sabadilla.</p>	<p>Chemical would not be applied for this purpose (botanical pesticide). Application would be as minimal as possible while being effective and follow all EPA label requirements.</p>



<p>9.4.3 Processing Materials List  Rotenone  Class: Processing Pest Control (PPC)  Status: Restricted (R)</p> <p>See ‘Botanicals’ for restrictions. Particularly toxic to fish. Piperonyl butoxide may not be used as a synergist.</p>	<p>Chemical would not be applied for this purpose (botanical pesticide). Application would be as minimal as possible while being effective and follow all EPA label requirements.</p>
<b>STANDARDS PERTAINING TO WATER</b>	
<b>2.0 Farm Certification Standards</b>	
<p>2.5 Required Practices  2.5.1 Organic production focuses on natural processes and their management: materials and products are an adjunct to, not a replacement for, effective management practices. If inputs are used, materials of microbial, plant, or animal origin must form the basis of the fertility program. Nutrients and fertility products must be applied in a manner that protects soil, water, and the biodiversity. Restrictions may be applied by the OCIA International Office, for International Members, or by the Chapter Certification Review Committee, for Chapter Members, based on the amounts, location, timing, treatments, methods, and/or choice of inputs used.</p>	<p>Proposed Action would not determine how private landowners apply nutrient and fertility products.</p>
<p>2.8 Soils and Plants  2.8.2 Minerals  d. Mineral fertilizers must be applied in the form in which they are naturally composed and extracted. Minerals cannot be rendered more soluble by chemical treatment, other than the addition of water and mixing with other allowed, naturally occurring materials. The Chapter Certification Committee or the OCIA International Office may grant exceptions on a case-by-case basis. Exceptions cannot be granted for mineral fertilizers containing nitrogen.</p>	<p>Proposed Action would not determine how private landowners apply mineral fertilizers.</p>
<p>2.8 Soils and Plants  2.8.5 Soil and Water Conservation  4. Excessive exploitation and depletion of water resources are not allowed. In operations where water is scarce, water extraction should be monitored on a regular basis. All organic operations are encouraged to recycle rainwater,</p>	<p>Proposed Action would not affect water quantity. Proposed Action would not determine how private landowners manage water quantity.</p>

where feasible.	
2.8 Soils and Plants 2.8.5 Soil and Water Conservation 5. Relevant measures shall be taken to prevent salination of soil and water.	Proposed Action would not effect salination. Proposed Action would not determine how private landowners manage salination.
3. Animal Certification Standards	
3.3 Living Conditions 3.3.1 Management of the environment of the animals must take into account the behavioral needs of the animal and provide for: e. Ample access to fresh water and feed according to the needs of the animals	Proposed Action would not affect water quantity. Proposed Action would not determine how private landowners manage living conditions of animals.
3.3 Living Conditions 3.3.5 Routine confinement of animals in crates or boxes where they cannot move freely is prohibited. b. Temporary exemptions for penning of animals may be allowed based on the animal's stage of growth, weather conditions, animal health, and safety. Temporary exemptions may also be allowed based on the need to protect plant, soil, and water quality.	Proposed Action would not determine how private landowners manage living conditions of animals.
3.4 Manure Management 3.4.1 Manure management practices used to maintain any area in which livestock are penned, housed, or pastured must be implemented in a manner that: a. minimizes soil and water degradation	Proposed Action would not determine how private landowners manage manure.
3.4 Manure Management 3.4.1 b. does not contribute to contamination of water by nitrates and pathogenic bacteria	Proposed Action would not add nitrates or pathogenic bacteria to the water. Proposed Action would not determine how private landowners manage manure.
3.4 Manure Management 3.4.2 All manure storage and handling facilities, including composting facilities must be designed, constructed and operated to prevent contamination of ground and/or surface water.	Proposed Action would not determine how private landowners manage manure.
3.4 Manure Management 3.4.3 Manure application rates must be at levels	Proposed Action would not determine how private landowners manage manure.

that do not contribute to ground and/or surface water contamination. The timing and application methods and rates must be in compliance with Section 2.3.1, Organic Matter, of these standards and must not increase the potential for run-off into ponds, rivers and streams.	
<p>3.5 Feed</p> <p>3.5.10 Water for livestock must be free of contamination from hazardous substances.</p>	<p>Analysis indicates that under the Proposed Action it is possible that rotenone may reach one private landowner prior to it being neutralized. This would occur at most for 1 day a year for up to 3 consecutive years. Because neutralization would have been occurring, the concentration level would be lower than the application concentration, and it would continue to lower over time and distance through natural degradation. The application concentration is expected to be lower than the maximum allowed (200 ppb). Even at the maximum application concentration, with neutralization and natural degradation the risks to mammals are “far below the level of concern” and “there is no basis for asserting that adverse effects are plausible in large and small mammals when rotenone is applied at the highest application rate considered in the risk assessment (200 ppb)” (Forest Service 2008). The acute hazard quotient (i.e. for acute toxicity) for birds, based on the maximum application concentration, with neutralization and natural degradation, is also below the level of concern (Forest Service 2008). Chronic exposure is not expected because of the short duration of the application.</p>
<p>3.5 Feed</p> <p>3.5.11 Animals must have access to drinkable water in all paddocks during periods when fluid intake from forage is insufficient.</p>	<p>Proposed Action would not determine how private landowners manage water availability for animals.</p>
<p>3.9 Herd Health</p> <p>3.9.1 Good management is the key to keeping healthy livestock. Organic production systems shall be designed and maintained to provide compatible housing, proper nutrition, adequate clean water and proper ventilation, including</p>	<p>Proposed Action would not affect water quantity. Proposed Action would not determine how private landowners provide water to animals.</p>

techniques which are organically acceptable.	
<p>3.15 Standards for Dairy Production</p> <p>3.15.9 Water Quality</p> <p>a. Dairy animals must drink water with nitrate levels below 10 mg nitrate, nitrogen/liter (45 mg NO<sub>3</sub>/liter) and satisfy all state requirements concerning bacteria and other microlife. If a farmer is unable to meet these requirements, a farm plan response shall be implemented to come into compliance.</p>	Proposed Action would not affect nitrate levels.
4. Specialty Crop Certification Standards	
<p>4.1 Greenhouse</p> <p>Air and water quality must meet government standards.</p>	Proposed Action requires application to meet all regulatory requirements.
<p>4.2 Honey</p> <p>4.2.4 Foraging Areas</p> <p>b. Beekeeper must provide clean water (Authorized Methods and Materials: Dairy and Eggs, Section 10: Water Quality) and sufficient OCIA forage to feed the bees throughout the season.</p>	Proposed Action would not affect water quantity. Proposed Action would not determine how private landowners provide water to animals. Rotenone, as would be applied, is considered “practically non-toxic” to honeybees (Forest Service 2008).
<p>4.2 Honey</p> <p>4.2.6 Honey Treatment</p> <p>i. Extracting facility should be well lit with facilities to wash down daily with copious amounts of fresh, clean, hot water.</p>	Proposed Action would not affect water quantity. Proposed Action would not determine how private landowners manage honey treatment facilities.
<p>4.2 Honey</p> <p>4.2.6 Honey Treatment</p> <p>j. Accumulated numbers of bees in extracting area should be allowed to gather and then washed down with water and disposed of or put in a nearby hive.</p>	Proposed Action would not affect water quantity. Proposed Action would not determine how private landowners manage honey treatment facilities.
<p>4.4 Shiitake and Oyster Mushrooms</p> <p>4.4.5 Water</p> <p>Well, stream and pond water used for soaking logs and blocks must be tested to determine if concentrations of nitrates and coliforms are acceptably low. Use of chlorinated water in urban areas is acceptable. Use of water known to be contaminated with toxic substances, byproducts of urban, industrial or waste treatment processes is prohibited.</p>	Proposed Action would not affect nitrate or coliform concentration. Analysis indicates that under the Proposed Action it is possible that rotenone may reach one private landowner prior to it being neutralized. This would occur at most for 1 day a year for up to 3 consecutive years. Because neutralization would have been occurring, the concentration level would be lower than the application concentration. If the effect were to occur, it

	<p>would be for an extremely short duration in a very limited area.</p> <p>The Non-chemical Treatment alternative would not affect water quantity, and would add no substances or chemicals; therefore, it would not affect nitrate or coliform concentration.</p>
<p>4.5. Sprouts</p> <p>4.5.1. This annex is intended to complement the admissibility criteria, authorized materials and methods, and certification procedures, as detailed elsewhere in the standards. It refers both to water grown sprouts and soil grown sprouts.</p> <p>b. Water used for watering and rinsing must be consistent with OCIA processing water standards. It must meet government regulations, e.g. potable water.</p>	<p>Proposed Action would require meeting regulatory requirements. Analysis indicates that under the Proposed Action it is possible that rotenone may reach one private landowner prior to it being neutralized. This would occur at most for 1 day a year for up to 3 consecutive years. The water right in this area is for livestock watering, not drinking water.</p>
<p>4.5. Sprouts</p> <p>4.5.1.</p> <p>d. Fertilizers and soil amendments must meet OCIA standards. No soluble fertilizers may be added to the irrigating water.</p>	<p>Proposed Action would not add soluble fertilizer to the irrigating water.</p>
<p>4.8 Lake Grown Wild Rice Standards</p> <p>[This section includes standards that discuss water quality in lake areas used for wild rice production.]</p>	<p>Growing wild rice in lakes is not a practice in the treatment area.</p>
<p>4.9 Coffee Production Standards</p> <p>[This section includes standards that discuss water quality used for coffee production.]</p>	<p>Because of local climate, coffee production is not a foreseeable practice in the treatment area.</p>
<p>5.0 Processing Certification Standards</p>	
<p>5.1 Raw Materials</p> <p>5.1.3 Salt and water are considered inert, non-certifiable ingredients and must conform with OCIA's quality standards for them. (Note: in the calculations of percentages of organic ingredients, added water and salt shall not be included.).</p>	<p>See other sections regarding OCIA quality standards regarding water.</p>
<p>11. Organic Aquaculture Production Guidelines</p> <p>9. Aquaculture Production Standards</p> <p>[This section includes standards that discuss water quality used for aquaculture production.]</p>	<p>Aquaculture production is not a practice in the treatment area.</p>

<b>POTASSIUM PERMANGANATE</b>	
<p>3.0 Animal Certification Standards</p> <p>3.9 Herd Health</p> <p>3.9.2 Cleaning agents and disinfectants should be chosen from among soaps, biodegradable detergents, iodine 5%, 1% potassium permanganate solutions, lye, alkali carbonates, caustic potash, lime, hydrogen peroxide, and bleach.</p>	<p>Proposed Action application of potassium permanganate would be 2 to 4 times application of rotenone. At maximum application of rotenone, this would be 400 to 800 ppb, which is equivalent to .004% to .008% potassium permanganate.</p>
<p>9.0 Materials List</p> <p>9.3 Crop Production Materials List</p> <p>Manganese Products, prohibited</p> <p>Class: Fertilizers, Plant Foods, and Soil Amendments (F)</p> <p>Status: Prohibited (P) - materials may not be used on land in the certification program, or in the production of any crops grown on land in the certification program. At least three years must pass after the use of any prohibited substances before land, which has received that substance, may be certified.</p> <p>Manganese chloride, manganese nitrate, and potassium permanganate are prohibited. See 'Micronutrients, synthetic, prohibited'.</p>	<p>Chemical would not be applied for this purpose. Chemical would not be applied to soil or plants. At maximum, application would be equivalent to .004% to .008% potassium permanganate.</p>

Appendix 4. Regulations relating to rotenone, water quality, and potassium permanganate for certified operations under the USDA National Organic Program, 7 CFR Part 205, January 1, 2010 edition.

<p>§205.202 Land requirements Any field or farm parcel from which harvested crops are intended to be sold, labeled, or represented as “organic,” must: Have been managed in accordance with the provisions of §§205.203 through 205.206; Have had no prohibited substances, as listed in §205.105 applied to it for a period of 3 years immediately preceding harvest of the crop; and Have distinct, defined boundaries and buffer zones such as runoff diversions to prevent the unintended application of a prohibited substance to the crop or contact with a prohibited substance applied to adjoining land that is not under organic management.</p>	<p>Proposed Action would not determine how private landowners manage nutrient and fertility products, stock, crop rotation, or pests. Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on the lists or prohibited substances referenced in §205.105.</p> <p>Non-chemical Treatment alternative would not determine how private landowners manage nutrient and fertility products, stock, crop rotation, or pests. No chemicals, thus no prohibited substances, would be applied under the Non-chemical Treatment alternative.</p>
<p>§205.203 Soil fertility and crop nutrient management practice standard. The producer must manage plant and animal materials to maintain or improve soil organic matter content in a manner that does not contribute to contamination of crops, soil, or water by plant nutrients, pathogenic organisms, heavy metals, or residues of prohibited substances.</p>	<p>Proposed Action would not determine how private landowners apply nutrient and fertility products to protect water quality.</p>
<p>§205.237 Livestock feed. The producer of an organic livestock operation must provide livestock with a total feed ration composed of agricultural products, including pasture and forage, that are organically produced and, if applicable, organically handled: <i>Except</i>, That, nonsynthetic substances and synthetic substances allowed under §205.603 may be used as feed additives and supplements.</p>	<p>See §205.603</p>
<p>§205.239 Livestock living conditions. The producer of an organic livestock operation may provide temporary confinement for an animal because of: Risk to soil or water quality The producer of an organic livestock operation must manage manure in a manner that does not contribute to contamination of crops, soil, or water by plant nutrients, heavy metals, or</p>	<p>The Proposed Action does not determine how private landowners manage livestock living conditions.</p>

pathogenic organisms and optimizes recycling of nutrients.	
<p>§205.270 Organic handling requirements Nonagricultural substances allowed under §205.605 and nonorganically produced agricultural products allowed under §205.606 may be used. . .</p> <p>The handler of an organic handling operation must not use in or on agricultural products intended to be sold, labeled, or represented as “100 percent organic,” “organic,” or “made with organic (specified ingredients or food group(s)),” or in or on any ingredients labeled as organic:</p> <p>...</p> <p>A volatile synthetic solvent or other synthetic processing aid not allowed under §205.605. . .</p>	Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on the §205.605 or §205.606 lists.
§205.271 Facility pest management practice standard	Proposed Action would not determine how private landowners conduct pest management.
<p>§205.272 Commingling and contact with prohibited substance prevention practice standard</p> <p>The handler of an organic handling operation must implement measures necessary to prevent the commingling of organic and nonorganic products and protect organic products from contact with prohibited substances.</p>	The Proposed Action would not affect handling operations. Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on the §205.602 or §205.604 lists of prohibited substances.
§205.601 Synthetic substances allowed for use in organic crop production.	Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on this list.
§205.602 Nonsynthetic substances prohibited for use in organic crop production	Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on this list.
§205.603 Synthetic substances allowed for use in organic livestock production	Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on this list.
§205.604 Nonsynthetic substances prohibited for use in organic livestock production.	Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on this list.
§205.605 Nonagricultural (nonorganic) substances allowed as ingredients in or on	Chemicals of the Proposed Action, their formulations, and their byproducts post



processed products labeled as “organic” or “made with organic (specified ingredients or food group(s)).”	neutralization or degradation are not on this list.
§205.606. Nonorganically produced agricultural products allowed as ingredients in or on processed products labeled as “organic.”	Chemicals of the Proposed Action, their formulations, and their byproducts post neutralization or degradation are not on this list.